

# SEQUENCE LISTING

<110> MEYERS, Rachel A.  
WILLIAMSON, Mark

<120> 47169 and 33935, Novel Human Glycosyl Transferases and  
Uses Thereof

<130> 10147-56U1

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<141> 2001-11-20

<150> US 60/249,939

<151> 2000-11-20

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Asp Ile Pro Leu His Glu Lys Lys Met Thr Pro Gly His Leu Leu Val		
	290	295 300
Ser Val Gly Gln Phe Arg Pro Glu Lys Asn His Pro Leu Gln Ile Arg		

305                      310                      315                      320  
 Ala Phe Ala Lys Leu Leu Asn Lys Lys Met Val Glu Ser Pro Pro Ser  
                          325                      330                      335  
 Leu Lys Leu Val Leu Ile Gly Gly Cys Arg Asn Lys Asp Asp Glu Leu  
                          340                      345                      350  
 Arg Val Asn Gln Leu Arg Arg Leu Ser Glu Asp Leu Gly Val Gln Glu  
                          355                      360                      365  
 Tyr Val Glu Phe Lys Ile Asn Ile Pro Phe Asp Glu Leu Lys Asn Tyr  
                          370                      375                      380  
 Leu Ser Glu Ala Thr Ile Gly Leu His Thr Met Trp Asn Glu His Phe  
 385                      390                      395                      400  
 Gly Ile Gly Val Val Glu Cys Met Ala Ala Gly Thr Ile Ile Leu Ala  
                          405                      410                      415  
 His Asn Ser Gly Gly Pro Lys Leu Asp Ile Val Val Pro His Glu Gly  
                          420                      425                      430  
 Asp Ile Thr Gly Phe Leu Ala Glu Ser Glu Glu Asp Tyr Ala Glu Thr  
                          435                      440                      445  
 Ile Ala His Ile Leu Ser Met Ser Ala Glu Lys Arg Leu Gln Ile Arg  
                          450                      455                      460  
 Lys Ser Ala Arg Ala Ser Val Ser Arg Phe Ser Asp Gln Glu Phe Glu  
 465                      470                      475                      480  
 Val Thr Phe Leu Ser Ser Val Glu Lys Leu Phe Lys  
                          485                      490

<210> 13

<211> 3044

<212> DNA

<213> Homo sapiens

<400> 13

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 ggaatcagac tgctgctaca gagaaagaaa aaattagtggt caactagcaa aaatgggaaa 180  
 aatcaaatgg tgattgcatt ttttcatcca tactgcaatg ctggtggagg aggagaaaga 240  
 gttttatggt gtgctttaag agccctgcag aaaaagtatc ctgaagcagt ttatgttggt 300  
 tataccggcg atgttaatgt caacgggtcaa cagatactag aaggtgcttt cagaagattt 360

aacatcagat taattcaccc agtgcagttt gtttttttaa ggaaacgcta tcttgtggaa 420  
 gattcactgt atcctcactt cactcgtcgt ggccaaagtc taggatccat ttttcttggc 480  
 tgggaagctc taatgcagtg tgttcctgat gtttacattg attcaatggg atacgctttt 540  
 acgcttcctc tgtttaagta tatagggggt tgccaagttg gaagctatgt tcattatcct 600  
 actatcagca ccgacatgct ctctgtagtg aagaatcaaa atattggatt taataatgca 660  
 gccttcatta ccaggaatcc ttttctcagc aaagtaaagc tcatctacta ctatttattt 720  
 gcttttattt atggacttgt tggttcttgc agtgatgtag tcatgggtcaa ttcttcttgg 780  
 acactaaacc atattctctc actatggaaa gttgggaatt gcaactaacat tgtttatcca 840  
 ccttgtgatg tgcagacatt tctggacatt cccttacatg agaaaaagat gaccccagga 900  
 catttgcctgg tttctgttgg ccagtttagg ccggaaaaga atcatccatt gcagatcaga 960  
 gcctttgcta aattgctgaa taagaagatg gttgagtcac ctcttctgct taaacttgct 1020  
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 gggattggag ttgtggagtg tatggcagct ggcacaatta tccttgca caattcgggg 1260  
 ggcccaaagc ttgacattgt ggttctcac gaaggagata taactggctt tctggctgag 1320  
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 tggctgagag tgaagaagac tatgctgaaa ctatcgctca cattctttcc atgtctgcag 2940  
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 aatttgaagt gacattccta tcatctgtgg aaaagttatt taag 3044

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<210> 16  
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<210> 18  
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<210> 19  
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<210> 20  
<211> 559  
<212> PRT  
<213> Homo sapiens

<400> 20  
Met Arg Lys Phe Ala Tyr Cys Lys Val Val Leu Ala Thr Ser Leu Ile  
1 5 10 15

Trp Val Leu Leu Asp Met Phe Leu Leu Leu Tyr Phe Ser Glu Cys Asn  
20 25 30

Lys Cys Asp Glu Lys Lys Glu Arg Gly Leu Pro Ala Gly Asp Val Leu  
35 40 45

Glu Pro Val Gln Lys Pro His Glu Gly Pro Gly Glu Met Gly Lys Pro  
50 55 60

Val Val Ile Pro Lys Glu Asp Gln Glu Lys Met Lys Glu Met Phe Lys

65		70		75		80
Ile Asn Gln Phe Asn Leu Met Ala Ser Glu Met Ile Ala Leu Asn Arg						
	85			90		95
Ser Leu Pro Asp Val Arg Leu Glu Gly Cys Lys Thr Lys Val Tyr Pro						
	100			105		110
Asp Asn Leu Pro Thr Thr Ser Val Val Ile Val Phe His Asn Glu Ala						
	115			120		125
Trp Ser Thr Leu Leu Arg Thr Val His Ser Val Ile Asn Arg Ser Pro						
	130			135		140
Arg His Met Ile Glu Glu Ile Val Leu Val Asp Asp Ala Ser Glu Arg						
	145			150		160
Asp Phe Leu Lys Arg Pro Leu Glu Ser Tyr Val Lys Lys Leu Lys Val						
	165			170		175
Pro Val His Val Ile Arg Met Glu Gln Arg Ser Gly Leu Ile Arg Ala						
	180			185		190
Arg Leu Lys Gly Ala Ala Val Ser Lys Gly Gln Val Ile Thr Phe Leu						
	195			200		205
Asp Ala His Cys Glu Cys Thr Val Gly Trp Leu Glu Pro Leu Leu Ala						
	210			215		220
Arg Ile Lys His Asp Arg Arg Thr Val Val Cys Pro Ile Ile Asp Val						
	225			230		240
Ile Ser Asp Asp Thr Phe Glu Tyr Met Ala Gly Ser Asp Met Thr Tyr						
	245			250		255
Gly Gly Phe Asn Trp Lys Leu Asn Phe Arg Trp Tyr Pro Val Pro Gln						
	260			265		270
Arg Glu Met Asp Arg Arg Lys Gly Asp Arg Thr Leu Pro Val Arg Thr						
	275			280		285
Pro Thr Met Ala Gly Gly Leu Phe Ser Ile Asp Arg Asp Tyr Phe Gln						
	290			295		300
Glu Ile Gly Thr Tyr Asp Ala Gly Met Asp Ile Trp Gly Gly Glu Asn						
	305			310		320
Leu Glu Ile Ser Phe Arg Ile Trp Gln Cys Gly Gly Thr Leu Glu Ile						

325	330	335
Val Thr Cys Ser His Val Gly His Val Phe Arg Lys Ala Thr Pro Tyr		
340	345	350
Thr Phe Pro Gly Gly Thr Gly Gln Ile Ile Asn Lys Asn Asn Arg Arg		
355	360	365
Leu Ala Glu Val Trp Met Asp Glu Phe Lys Asn Phe Phe Tyr Ile Ile		
370	375	380
Ser Pro Gly Val Thr Lys Val Asp Tyr Gly Asp Ile Ser Ser Arg Val		
385	390	395
Gly Leu Arg His Lys Leu Gln Cys Lys Pro Phe Ser Trp Tyr Leu Glu		
405	410	415
Asn Ile Tyr Pro Asp Ser Gln Ile Pro Arg His Tyr Phe Ser Leu Gly		
420	425	430
Glu Ile Arg Lys Glu Glu Thr Asn Gln Cys Leu Asp Asn Met Ala Arg		
435	440	445
Lys Glu Asn Glu Lys Val Gly Ile Phe Asn Cys His Gly Met Gly Gly		
450	455	460
Asn Gln Val Phe Ser Tyr Thr Ala Asn Lys Glu Ile Arg Thr Asp Asp		
465	470	475
Leu Cys Leu Asp Val Ser Lys Leu Asn Gly Pro Val Thr Met Leu Lys		
485	490	495
Cys His His Leu Lys Gly Asn Gln Leu Trp Glu Tyr Asp Pro Val Lys		
500	505	510
Leu Thr Leu Gln His Val Asn Ser Asn Gln Cys Leu Asp Lys Ala Thr		
515	520	525
Glu Glu Asp Ser Gln Val Pro Ser Ile Arg Asp Cys Asn Gly Ser Arg		
530	535	540
Ser Gln Gln Trp Leu Leu Arg Asn Val Thr Leu Pro Glu Ile Phe		
545	550	555

<210> 21  
 <211> 559  
 <212> PRT

<213> Rattus sp.

<400> 21

Met Arg Lys Phe Ala Tyr Cys Lys Val Val Leu Ala Thr Ser Leu Val  
1 5 10 15

Trp Val Leu Leu Asp Met Phe Leu Leu Leu Tyr Phe Ser Glu Cys Asn  
20 25 30

Lys Cys Glu Glu Lys Lys Glu Arg Gly Leu Pro Ala Gly Asp Val Leu  
35 40 45

Glu Leu Val Gln Lys Pro His Glu Gly Pro Gly Glu Met Gly Lys Pro  
50 55 60

Val Val Ile Pro Lys Glu Asp Gln Glu Lys Met Lys Glu Met Phe Lys  
65 70 75 80

Ile Asn Gln Phe Asn Leu Met Ala Ser Glu Met Ile Ala Phe Asn Arg  
85 90 95

Ser Leu Pro Asp Val Arg Leu Glu Gly Cys Lys Thr Lys Val Tyr Pro  
100 105 110

Asp Ser Leu Pro Thr Thr Ser Val Val Ile Val Phe His Asn Glu Ala  
115 120 125

Trp Ser Thr Leu Leu Arg Thr Val His Ser Val Ile Asn Arg Ser Pro  
130 135 140

Arg His Met Ile Glu Glu Ile Val Leu Val Asp Asp Ala Ser Glu Arg  
145 150 155 160

Asp Phe Leu Lys Arg Pro Leu Glu Ser Tyr Val Lys Lys Leu Lys Val  
165 170 175

Pro Val His Val Ile Arg Met Glu Gln Arg Ser Gly Leu Ile Arg Ala  
180 185 190

Arg Leu Lys Gly Ala Ala Val Ser Lys Gly Gln Val Ile Thr Phe Leu  
195 200 205

Asp Ala His Cys Glu Cys Thr Val Gly Trp Leu Glu Pro Leu Leu Ala  
210 215 220

Arg Ile Lys His Asp Arg Arg Thr Val Val Cys Pro Ile Ile Asp Val  
225 230 235 240

Ile Ser Asp Asp Thr Phe Glu Tyr Met Ala Gly Ser Asp Met Thr Tyr  
 245 250 255

Gly Gly Phe Asn Trp Lys Leu Asn Phe Arg Trp Tyr Pro Val Pro Gln  
 260 265 270

Arg Glu Met Asp Arg Arg Lys Gly Asp Arg Thr Leu Pro Val Arg Thr  
 275 280 285

Pro Thr Met Ala Gly Gly Leu Phe Ser Ile Asp Arg Asp Tyr Phe Gln  
 290 295 300

Glu Ile Gly Thr Tyr Asp Ala Gly Met Asp Ile Trp Gly Gly Glu Asn  
 305 310 315 320

Leu Glu Ile Ser Phe Arg Ile Trp Gln Cys Gly Gly Thr Leu Glu Ile  
 325 330 335

Val Thr Cys Ser His Val Gly His Val Phe Arg Lys Ala Thr Pro Tyr  
 340 345 350

Thr Phe Pro Gly Gly Thr Gly Gln Ile Ile Asn Lys Asn Asn Arg Arg  
 355 360 365

Leu Ala Glu Val Trp Met Asp Glu Phe Lys Asn Phe Phe Tyr Ile Ile  
 370 375 380

Ser Pro Gly Val Thr Lys Val Asp Tyr Gly Asp Ile Ser Ser Arg Val  
 385 390 395 400

Gly Leu Arg His Lys Leu Gln Cys Lys Pro Phe Ser Trp Tyr Leu Glu  
 405 410 415

Asn Ile Tyr Pro Asp Ser Gln Ile Pro Arg His Tyr Phe Ser Leu Gly  
 420 425 430

Glu Ile Arg Asn Val Glu Thr Asn Gln Cys Leu Asp Asn Met Ala Arg  
 435 440 445

Lys Glu Asn Glu Lys Val Gly Ile Phe Asn Cys His Gly Met Gly Gly  
 450 455 460

Asn Gln Val Phe Ser Tyr Thr Ala Asn Lys Glu Ile Arg Thr Asp Asp  
 465 470 475 480

Leu Cys Leu Asp Val Ser Lys Leu Asn Gly Pro Val Thr Met Leu Lys  
 485 490 495



Cys His His Leu Lys Gly Asn Gln Leu Trp Glu Tyr Asp Pro Val Lys  
 500 505 510

Leu Thr Leu Gln His Val Asn Ser Asn Gln Cys Leu Asp Lys Ala Thr  
 515 520 525

Glu Glu Asp Ser Gln Val Pro Ser Ile Arg Asp Cys Thr Gly Ser Arg  
 530 535 540

Ser Gln Gln Trp Leu Leu Arg Asn Val Thr Leu Pro Glu Ile Phe  
 545 550 555

<210> 22

<211> 559

<212> PRT

<213> Mus sp.

<400> 22

Met Arg Lys Phe Ala Tyr Cys Lys Val Val Leu Ala Thr Ser Leu Val  
 1 5 10 15

Trp Val Leu Leu Asp Met Phe Leu Leu Leu Tyr Phe Ser Glu Cys Asn  
 20 25 30

Lys Cys Glu Glu Lys Gln Glu Arg Gly Leu Pro Ala Gly Asp Val Leu  
 35 40 45

Glu Leu Val Gln Lys Pro His Glu Gly Pro Gly Glu Met Gly Lys Pro  
 50 55 60

Val Val Ile Pro Lys Glu Asp Gln Glu Lys Met Lys Glu Met Phe Lys  
 65 70 75 80

Ile Asn Gln Phe Asn Leu Met Ala Ser Glu Met Ile Ala Leu Asn Arg  
 85 90 95

Ser Leu Pro Asp Val Arg Leu Glu Gly Cys Lys Thr Lys Val Tyr Pro  
 100 105 110

Asp Asn Leu Pro Thr Thr Ser Val Val Ile Val Phe His Asn Glu Ala  
 115 120 125

Trp Ser Thr Leu Leu Arg Thr Val His Ser Val Ile Asn Arg Ser Pro  
 130 135 140

Arg His Met Ile Glu Glu Ile Val Leu Val Asp Asp Ala Ser Glu Arg  
 145 150 155 160

Asp Phe Leu Lys Arg Pro Leu Glu Ser Tyr Val Lys Lys Leu Lys Val  
 165 170 175

Pro Val His Val Ile Arg Met Glu Gln Arg Ser Gly Leu Ile Arg Ala  
 180 185 190

Arg Leu Lys Gly Ala Ala Val Ser Arg Gly Gln Val Ile Thr Phe Leu  
 195 200 205

Asp Ala His Cys Glu Cys Thr Ala Gly Trp Leu Glu Pro Leu Leu Ala  
 210 215 220

Arg Ile Lys His Asp Arg Arg Thr Val Val Cys Pro Ile Ile Asp Val  
 225 230 235 240

Ile Ser Asp Asp Thr Phe Glu Tyr Met Ala Gly Ser Asp Met Thr Tyr  
 245 250 255

Gly Gly Phe Asn Trp Lys Leu Asn Phe Arg Trp Tyr Pro Val Pro Gln  
 260 265 270

Arg Glu Met Asp Arg Arg Lys Gly Asp Arg Thr Leu Pro Val Arg Thr  
 275 280 285

Pro Thr Met Ala Gly Gly Leu Phe Ser Ile Asp Arg Asp Tyr Phe Gln  
 290 295 300

Glu Ile Gly Thr Tyr Asp Ala Gly Met Asp Ile Trp Gly Gly Glu Asn  
 305 310 315 320

Leu Glu Ile Ser Phe Arg Ile Trp Gln Cys Gly Gly Thr Leu Glu Ile  
 325 330 335

Val Thr Cys Ser His Val Gly His Val Phe Arg Lys Ala Thr Pro Tyr  
 340 345 350

Thr Phe Pro Gly Gly Thr Gly Gln Ile Ile Asn Lys Asn Asn Arg Arg  
 355 360 365

Leu Ala Glu Val Trp Met Asp Glu Phe Lys Asn Phe Phe Tyr Ile Ile  
 370 375 380

Ser Pro Gly Val Thr Lys Val Asp Tyr Gly Asp Ile Ser Ser Arg Leu  
 385 390 395 400

Gly Leu Arg Arg Lys Leu Gln Cys Lys Pro Phe Ser Trp Tyr Leu Glu  
 405 410 415

Asn Ile Tyr Pro Asp Ser Gln Ile Pro Arg His Tyr Phe Ser Leu Gly  
420 425 430

Glu Ile Arg Asn Val Glu Thr Asn Gln Cys Leu Asp Asn Met Ala Arg  
435 440 445

Lys Glu Asn Glu Lys Val Gly Ile Phe Asn Cys His Gly Met Gly Gly  
450 455 460

Asn Gln Val Phe Ser Tyr Thr Ala Asn Lys Glu Ile Arg Thr Asp Asp  
465 470 475 480

Leu Cys Leu Asp Val Ser Lys Leu Asn Gly Pro Val Thr Met Leu Lys  
485 490 495

Cys His His Leu Lys Gly Asn Gln Leu Trp Glu Tyr Asp Pro Val Lys  
500 505 510

Leu Thr Leu Gln His Val Asn Ser Asn Gln Cys Leu Asp Lys Ala Thr  
515 520 525

Glu Glu Asp Ser Gln Val Pro Ser Ile Arg Asp Cys Thr Gly Ser Arg  
530 535 540

Ser Gln Gln Trp Leu Leu Arg Asn Val Thr Leu Pro Glu Ile Phe  
545 550 555

<210> 23

<211> 559

<212> PRT

<213> Bos sp.

<400> 23

Met Arg Lys Phe Ala Tyr Cys Lys Val Val Leu Ala Thr Ser Leu Ile  
1 5 10 15

Trp Val Leu Leu Asp Met Phe Leu Leu Leu Tyr Phe Ser Glu Cys Asn  
20 25 30

Lys Cys Asp Glu Lys Lys Glu Arg Gly Leu Pro Ala Gly Asp Val Leu  
35 40 45

Glu Pro Val Gln Lys Pro His Glu Gly Pro Gly Glu Met Gly Lys Pro  
50 55 60

Val Val Ile Pro Lys Glu Asp Gln Glu Lys Met Lys Glu Met Phe Lys

65		70		75		80
Ile Asn Gln Phe Asn Leu Met Ala Ser Glu Met Ile Ala Leu Asn Arg						
	85		90		95	
Ser Leu Pro Asp Val Arg Leu Glu Gly Cys Lys Thr Lys Val Tyr Pro						
	100		105		110	
Asp Asn Leu Pro Thr Thr Ser Val Val Ile Val Phe His Asn Glu Ala						
	115		120		125	
Trp Ser Thr Leu Leu Arg Thr Val His Ser Val Ile Asn Arg Ser Pro						
	130		135		140	
Arg His Met Leu Glu Glu Ile Val Leu Val Asp Asp Ala Ser Glu Arg						
	145		150		155	160
Asp Phe Leu Lys Arg Pro Leu Glu Ser Tyr Val Lys Lys Leu Lys Val						
		165		170		175
Pro Val His Val Ile Arg Met Glu Gln Arg Ser Gly Leu Ile Arg Ala						
	180		185		190	
Arg Leu Lys Gly Ala Ala Val Ser Lys Gly Gln Val Ile Thr Phe Leu						
	195		200		205	
Asp Ala His Cys Glu Cys Thr Val Gly Trp Leu Glu Pro Leu Leu Ala						
	210		215		220	
Arg Ile Lys His Asp Arg Lys Thr Val Val Cys Pro Ile Ile Asp Val						
	225		230		235	240
Ile Ser Asp Asp Thr Phe Glu Tyr Met Ala Gly Ser Asp Met Thr Tyr						
	245		250		255	
Gly Gly Phe Asn Trp Lys Leu Asn Phe Arg Trp Tyr Pro Val Pro Gln						
	260		265		270	
Arg Glu Met Asp Arg Arg Lys Gly Asp Arg Thr Leu Pro Val Arg Thr						
	275		280		285	
Pro Thr Met Ala Gly Gly Leu Phe Ser Ile Asp Arg Asp Tyr Phe Gln						
	290		295		300	
Glu Ile Gly Thr Tyr Asp Ala Gly Met Asp Ile Trp Gly Gly Glu Asn						
	305		310		315	320
Leu Glu Ile Ser Phe Arg Ile Trp Gln Cys Gly Gly Thr Leu Glu Ile						

325	330	335
Val Thr Cys Ser His Val Gly His Val Phe Arg Lys Ala Thr Pro Tyr		
340	345	350
Thr Phe Pro Gly Gly Thr Gly Gln Ile Ile Asn Lys Asn Asn Arg Arg		
355	360	365
Leu Ala Glu Val Trp Met Asp Glu Phe Lys Asn Phe Phe Tyr Ile Ile		
370	375	380
Ser Pro Gly Val Thr Lys Val Asp Tyr Gly Asp Ile Ser Ser Arg Leu		
385	390	395
Gly Leu Arg His Lys Leu Gln Cys Arg Pro Phe Ser Trp Tyr Leu Glu		
405	410	415
Asn Ile Tyr Pro Asp Ser Gln Ile Pro Arg His Tyr Phe Ser Leu Gly		
420	425	430
Glu Ile Arg Asn Val Glu Thr Asn Gln Cys Leu Asp Asn Met Ala Arg		
435	440	445
Lys Glu Asn Glu Lys Val Gly Ile Phe Asn Cys His Gly Met Gly Gly		
450	455	460
Asn Gln Val Phe Ser Tyr Thr Ala Asn Lys Glu Ile Arg Thr Asp Asp		
465	470	475
Leu Cys Leu Asp Val Ser Lys Leu Asn Gly Pro Val Thr Met Leu Lys		
485	490	495
Cys His His Leu Lys Gly Asn Gln Leu Trp Glu Tyr Asp Pro Val Lys		
500	505	510
Leu Thr Leu Gln His Val Asn Ser Asn Gln Cys Leu Asp Lys Ala Thr		
515	520	525
Asp Glu Asp Ser Gln Val Pro Ser Ile Arg Asp Cys Ser Gly Ser Arg		
530	535	540
Ser Gln Gln Trp Leu Leu Arg Asn Val Thr Leu Pro Glu Ile Phe		
545	550	555

<210> 24  
 <211> 559  
 <212> PRT

<213> Sus sp.

<400> 24

Met Arg Lys Phe Ala Tyr Cys Lys Val Val Leu Ala Thr Ser Leu Ile  
1 5 10 15

Trp Val Leu Leu Asp Met Phe Leu Leu Leu Tyr Phe Ser Glu Cys Asn  
20 25 30

Lys Cys Asp Glu Lys Lys Glu Arg Gly Leu Pro Ala Gly Asp Val Leu  
35 40 45

Glu Pro Val Gln Lys Pro His Glu Gly Pro Gly Glu Met Gly Lys Pro  
50 55 60

Val Val Ile Pro Lys Glu Asp Gln Asp Lys Met Lys Glu Met Phe Lys  
65 70 75 80

Ile Asn Gln Phe Asn Leu Met Ala Ser Glu Met Ile Ala Leu Asn Arg  
85 90 95

Ser Leu Pro Asp Val Arg Leu Glu Gly Cys Lys Thr Lys Val Tyr Pro  
100 105 110

Asp Asn Leu Pro Thr Thr Ser Val Val Ile Val Phe His Asn Glu Ala  
115 120 125

Trp Ser Thr Leu Leu Arg Thr Val His Ser Val Ile Asn Arg Ser Pro  
130 135 140

Arg His Met Leu Glu Glu Ile Val Leu Val Asp Asp Ala Ser Glu Arg  
145 150 155 160

Asp Phe Leu Lys Arg Pro Leu Glu Ser Tyr Val Lys Lys Leu Lys Val  
165 170 175

Pro Val His Val Ile Arg Met Glu Gln Arg Ser Gly Leu Ile Arg Ala  
180 185 190

Arg Leu Lys Gly Ala Ala Val Ser Lys Gly Gln Val Ile Thr Phe Leu  
195 200 205

Asp Ala His Cys Glu Cys Thr Val Gly Trp Leu Glu Pro Leu Leu Ala  
210 215 220

Arg Ile Lys His Asp Arg Lys Thr Val Val Cys Pro Ile Ile Asp Val  
225 230 235 240

Ile Ser Asp Asp Thr Phe Glu Tyr Met Ala Gly Ser Asp Met Thr Tyr  
 245 250 255  
 Gly Gly Phe Asn Trp Lys Leu Asn Phe Arg Trp Tyr Pro Val Pro Gln  
 260 265 270  
 Arg Glu Met Asp Arg Arg Lys Gly Asp Arg Thr Leu Pro Val Arg Thr  
 275 280 285  
 Pro Thr Met Ala Gly Gly Leu Phe Ser Ile Asp Arg Asp Tyr Phe Gln  
 290 295 300  
 Glu Ile Gly Thr Tyr Asp Ala Gly Met Asp Ile Trp Gly Gly Glu Asn  
 305 310 315 320  
 Leu Glu Ile Ser Phe Arg Ile Trp Gln Cys Gly Gly Thr Leu Glu Ile  
 325 330 335  
 Val Thr Cys Ser His Val Gly His Val Phe Arg Lys Ala Thr Pro Tyr  
 340 345 350  
 Thr Phe Pro Gly Gly Thr Gly Gln Ile Ile Asn Lys Asn Asn Arg Arg  
 355 360 365  
 Leu Ala Glu Val Trp Met Asp Glu Phe Lys Thr Phe Phe Tyr Ile Ile  
 370 375 380  
 Ser Pro Gly Val Thr Lys Val Asp Tyr Gly Asp Ile Ser Ser Arg Leu  
 385 390 395 400  
 Gly Leu Arg His Lys Leu Gln Cys Arg Pro Phe Ser Trp Tyr Leu Glu  
 405 410 415  
 Asn Ile Tyr Pro Asp Ser Gln Ile Pro Arg His Tyr Ser Ser Leu Gly  
 420 425 430  
 Glu Ile Arg Asn Val Glu Thr Asn Gln Cys Leu Asp Asn Met Ala Arg  
 435 440 445  
 Lys Glu Asn Glu Lys Val Gly Ile Phe Asn Cys His Gly Met Gly Gly  
 450 455 460  
 Asn Gln Val Phe Ser Tyr Thr Ala Asn Lys Glu Ile Arg Thr Asp Asp  
 465 470 475 480  
 Leu Cys Leu Asp Val Ser Lys Leu Asn Gly Pro Val Thr Met Leu Lys  
 485 490 495

Cys His His Leu Lys Gly Asn Gln Leu Trp Glu Tyr Asp Pro Val Lys  
500 505 510

Leu Thr Leu Gln His Val Asn Ser Asn Gln Cys Leu Asp Lys Ala Thr  
515 520 525

Glu Glu Asp Ser Gln Val Pro Ser Ile Arg Asp Cys Ser Gly Ser Arg  
530 535 540

Ser Gln Gln Trp Leu Leu Arg Asn Val Thr Leu Pro Glu Ile Phe  
545 550 555

<210> 25

<211> 612

<212> PRT

<213> Caenorhabditis elegans

<400> 25

Met Leu Ser Val Gly Gly Gly Arg Ser Ala Val Cys Arg Ala Val Ile  
1 5 10 15

Ala Thr Ser Ile Val Trp Leu Leu Ile Asp Val Val Ile Leu Phe Tyr  
20 25 30

Tyr Leu Asp Pro Ser Thr Ser Gln Gln Gln Pro Phe Pro Glu Asp Asn  
35 40 45

Arg Ile Leu Asn Arg Ala Arg Arg Ile Glu Pro Leu Pro Pro Ala Ala  
50 55 60

Gln His Asp Ser Asp Pro Asp Ala His Pro Ile Gln Pro Glu Lys Gln  
65 70 75 80

Glu Lys Gln Val Tyr Pro Val Asp Lys Glu Thr Ala Asn Gln Leu Arg  
85 90 95

Lys Leu Met Glu Thr Gln Ala Phe Gly Pro Gly Tyr His Gly Gln Gly  
100 105 110

Gly Thr Gly Val Thr Val Pro Glu Asp Lys Lys Thr Ile Lys Glu Lys  
115 120 125

Arg Phe Leu Glu Asn Gln Phe Asn Val Val Ala Ser Glu Met Ile Ser  
130 135 140

Val Asn Arg Thr Leu Pro Asp Tyr Arg Ser Asp Ala Cys Arg Thr Ser  
145 150 155 160



Gly Asn Asn Leu Lys Thr Ala Gly Met Pro Lys Thr Ser Ile Ile Ile  
 165 170 175  
 Val Phe His Asn Glu Ala Trp Thr Thr Leu Leu Arg Thr Leu His Ser  
 180 185 190  
 Val Ile Asn Arg Ser Pro Arg His Leu Leu Glu Glu Ile Ile Leu Val  
 195 200 205  
 Asp Asp Lys Ser Asp Arg Asp Tyr Leu Val Lys Pro Leu Asp Ser Tyr  
 210 215 220  
 Ile Lys Met Phe Pro Ile Pro Ile His Leu Val His Leu Glu Asn Arg  
 225 230 235 240  
 Ser Gly Leu Ile Arg Ala Arg Leu Thr Gly Ser Glu Met Ala Lys Gly  
 245 250 255  
 Lys Ile Leu Leu Phe Leu Asp Ala His Val Glu Val Thr Asp Gly Trp  
 260 265 270  
 Leu Glu Pro Leu Val Ser Arg Val Ala Glu Asp Arg Lys Arg Val Val  
 275 280 285  
 Ala Pro Ile Ile Asp Val Ile Ser Asp Asp Thr Phe Glu Tyr Val Thr  
 290 295 300  
 Ala Ser Glu Thr Thr Trp Gly Gly Phe Asn Trp His Leu Asn Phe Arg  
 305 310 315 320  
 Trp Tyr Ala Val Pro Lys Arg Glu Leu Asn Arg Arg Gly Ser Asp Arg  
 325 330 335  
 Ser Met Pro Ile Gln Thr Pro Thr Ile Ala Gly Gly Leu Phe Ala Ile  
 340 345 350  
 Asp Lys Gln Phe Phe Tyr Asp Ile Gly Ser Tyr Asp Glu Gly Met Gln  
 355 360 365  
 Val Trp Gly Gly Glu Asn Leu Glu Ile Ser Phe Arg Val Trp Met Cys  
 370 375 380  
 Gly Gly Ser Leu Glu Ile His Pro Cys Ser Arg Val Gly His Val Phe  
 385 390 395 400  
 Arg Lys Gln Thr Pro Tyr Thr Phe Pro Gly Gly Thr Ala Lys Val Ile  
 405 410 415

His His Asn Ala Ala Arg Thr Ala Glu Val Trp Met Asp Glu Tyr Lys  
 420 425 430

Ala Phe Phe Tyr Lys Met Val Pro Ala Ala Arg Asn Val Glu Ala Gly  
 435 440 445

Asp Val Ser Glu Arg Lys Lys Leu Arg Glu Thr Leu Gln Cys Lys Ser  
 450 455 460

Phe Lys Trp Tyr Leu Glu Asn Ile Tyr Pro Glu Ala Pro Leu Pro Ala  
 465 470 475 480

Asp Phe Arg Ser Leu Gly Ala Ile Val Asn Arg Phe Thr Glu Lys Cys  
 485 490 495

Val Asp Thr Asn Gly Lys Lys Asp Gly Gln Ala Pro Gly Ile Gln Ala  
 500 505 510

Cys His Gly Ala Gly Gly Asn Gln Ala Trp Ser Leu Thr Gly Lys Gly  
 515 520 525

Glu Ile Arg Ser Asp Asp Leu Cys Leu Ser Ser Gly His Val Tyr Gln  
 530 535 540

Ile Gly Ser Glu Leu Lys Leu Glu Arg Cys Ser Val Ser Lys Ile Asn  
 545 550 555 560

Val Lys His Val Phe Val Phe Asp Asp Gln Ala Gly Thr Leu Leu His  
 565 570 575

Lys Lys Thr Gly Lys Cys Val Thr Gly Ala Asp Gln Arg Val Thr Leu  
 580 585 590

Asp Glu Cys Gly Leu Gly Arg Lys Asp Gln Met Trp Gln Leu Glu Gly  
 595 600 605

Tyr Gln Ser Pro  
 610

<210> 26  
 <211> 589  
 <212> PRT  
 <213> Caenorhabditis elegans

<400> 26  
 Met Leu Pro Arg Met Leu Lys Met Lys Thr Val Gly Thr Val Leu Ala

1	5	10	15
Val Ile Trp Leu Phe Gly Leu Ala Phe Ile Tyr Val Gln Ser Thr Ser			
20	25	30	
Ser Ser Leu Arg Pro Pro Gly Arg His Pro Pro Pro Leu Pro Gln Leu			
35	40	45	
Asp Pro Leu Ile Pro Gln Asn Pro Pro Gln Asn Asp Glu Ile Arg Pro			
50	55	60	
Lys Lys Ser Ala Pro Pro Ile Pro Thr Ile Asn Leu Ala Glu Asp Thr			
65	70	75	80
Thr Ile His Glu Arg Thr Glu Lys Asp Val Thr Trp Lys Thr Phe Asp			
85	90	95	
Val Glu Lys Phe Leu Asn Lys Gly Lys Trp His Gln Gly Glu Asp Lys			
100	105	110	
Tyr Lys Ala Asn Ser Phe Asn Gln Glu Ala Ser Asp Ala Leu Asn Pro			
115	120	125	
Thr Arg Lys Ile Pro Asp Ser Arg Glu Pro Gln Cys Arg Asp Val Asp			
130	135	140	
Tyr Ser Lys Val Gly Met Gln Pro Thr Thr Val Ile Ile Thr Tyr His			
145	150	155	160
Asn Glu Ala Arg Ser Ser Leu Leu Arg Thr Val Phe Ser Val Phe Asn			
165	170	175	
Gln Ser Pro Glu Glu Leu Leu Leu Glu Ile Val Leu Val Asp Asp Asn			
180	185	190	
Ser Gln Asp Val Glu Ile Gly Lys Glu Leu Ala Gln Ile Gln Arg Ile			
195	200	205	
Thr Val Leu Arg Asn Asn Gln Arg Glu Gly Leu Ile Arg Ser Arg Val			
210	215	220	
Lys Gly Ala Gln Val Ala Arg Ala Pro Val Leu Thr Phe Leu Asp Ser			
225	230	235	240
His Ile Glu Cys Asn Gln Lys Trp Leu Glu Pro Leu Leu Ala Arg Ile			
245	250	255	
Ala Glu Asn Pro Lys Ala Val Val Ala Pro Ile Ile Asp Val Ile Asn			

260	265	270
Val Asp Asn Phe Asn Tyr Val Gly Ala Ser Ala Asp Leu Arg Gly Gly		
275	280	285
Phe Asp Trp Thr Leu Val Phe Arg Trp Glu Phe Met Asn Glu Gln Leu		
290	295	300
Arg Lys Glu Arg His Ala His Pro Thr Ala Pro Ile Arg Ser Pro Thr		
305	310	315
Met Ala Gly Gly Leu Phe Ala Ile Ser Lys Glu Trp Phe Asn Glu Leu		
	325	330
Gly Thr Tyr Asp Leu Asp Met Glu Val Trp Gly Gly Glu Asn Leu Glu		
	340	345
Met Ser Phe Arg Val Trp Gln Cys Gly Gly Ser Leu Glu Ile Met Pro		
	355	360
Cys Ser Arg Val Gly His Val Phe Arg Lys Lys His Pro Tyr Thr Phe		
	370	375
Pro Gly Gly Ser Gly Asn Val Phe Gln Lys Asn Thr Arg Arg Ala Ala		
	385	390
Glu Val Trp Met Asp Glu Tyr Lys Ala Ile Tyr Leu Lys Asn Val Pro		
	405	410
Ser Ala Arg Phe Val Asn Phe Gly Asp Ile Thr Asp Arg Leu Ala Ile		
	420	425
Arg Asp Arg Leu Gln Cys Lys Ser Phe Lys Trp Tyr Leu Glu Asn Val		
	435	440
Tyr Pro Gln Leu Glu Ile Pro Arg Lys Thr Pro Gly Lys Ser Phe Gln		
	450	455
Met Lys Ile Gly Asn Leu Cys Leu Asp Ser Met Ala Arg Lys Glu Ser		
	465	470
Glu Ala Pro Gly Leu Phe Gly Cys His Gly Thr Gly Gly Asn Gln Glu		
	485	490
Trp Val Phe Asp Gln Leu Thr Lys Thr Phe Lys Asn Ala Ile Ser Gln		
	500	505
Leu Cys Leu Asp Phe Ser Ser Asn Thr Glu Asn Lys Thr Val Thr Met		

515                      520                      525  
 Val Lys Cys Glu Asn Leu Arg Pro Asp Thr Met Val Val Glu Lys Asn  
 530                      535                      540  
 Gly Trp Leu Thr Gln Gly Gly Lys Cys Leu Thr Val Asn Gln Gly Ser  
 545                      550                      555                      560  
 Gly Gly Asp Trp Leu Ile Tyr Gly Ala His Cys Glu Leu Asn Asn Gly  
 565                      570                      575  
 Ala Gln Arg Trp Ile Phe Glu Lys Leu Asp Thr Tyr Glu  
 580                      585

<210> 27  
 <211> 626  
 <212> PRT  
 <213> *Caenorhabditis elegans*

<400> 27  
 Met Ile Ile Phe Lys Lys Lys Ala Ile Leu Lys Val Leu Leu Leu Val  
 1                      5                      10                      15  
 Pro Val Phe Trp Ile Cys Ser Leu Ile Phe Phe Ala Ala Thr Ser Asn  
 20                      25                      30  
 Asp Ser Ser Gln Ile Gly Ser Asn Asn Asp Leu Ala Asn Lys Ile Ala  
 35                      40                      45  
 Glu Ala Asn Phe His Pro Lys Ala Ala Lys Gln Asp Val Ile Gln Gly  
 50                      55                      60  
 Phe Gly Pro Pro Ile Glu Pro Glu Pro Val Val Glu Asn Asn Lys Val  
 65                      70                      75                      80  
 Glu Glu Glu Glu Gln Pro Gly Gly Asn Leu Ala Lys Pro Lys Phe Met  
 85                      90                      95  
 Val Asp Pro Asn Asp Pro Ile Tyr Lys Lys Gly Asp Ala Ala Gln Ala  
 100                      105                      110  
 Gly Glu Leu Gly Lys Ala Val Val Val Asp Lys Thr Lys Leu Ser Thr  
 115                      120                      125  
 Glu Glu Lys Ala Lys Tyr Asp Lys Gly Met Leu Asn Asn Ala Phe Asn  
 130                      135                      140

Gln Tyr Ala Ser Asp Met Ile Ser Val His Arg Thr Leu Pro Thr Asn  
145 150 155 160

Ile Asp Ala Glu Cys Lys Thr Glu Lys Tyr Asn Glu Asn Leu Pro Arg  
165 170 175

Thr Ser Val Ile Ile Cys Phe His Asn Glu Ala Trp Ser Val Leu Leu  
180 185 190

Arg Thr Val His Ser Val Leu Glu Arg Thr Pro Asp His Leu Leu Glu  
195 200 205

Glu Val Val Leu Val Asp Asp Phe Ser Asp Met Asp His Thr Lys Arg  
210 215 220

Pro Leu Glu Glu Tyr Met Ser Gln Phe Gly Gly Lys Val Lys Ile Leu  
225 230 235 240

Arg Met Glu Lys Arg Glu Gly Leu Ile Arg Ala Arg Leu Arg Gly Ala  
245 250 255

Ala Val Ala Thr Gly Glu Val Leu Thr Tyr Leu Asp Ser His Cys Glu  
260 265 270

Cys Met Glu Gly Trp Met Glu Pro Leu Leu Asp Arg Ile Lys Arg Asp  
275 280 285

Pro Thr Thr Val Val Cys Pro Val Ile Asp Val Ile Asp Asp Asn Thr  
290 295 300

Phe Glu Tyr His His Ser Lys Ala Tyr Phe Thr Ser Val Gly Gly Phe  
305 310 315 320

Asp Trp Gly Leu Gln Phe Asn Trp His Ser Ile Pro Glu Arg Asp Arg  
325 330 335

Lys Asn Arg Thr Arg Pro Ile Asp Pro Val Arg Ser Pro Thr Met Ala  
340 345 350

Gly Gly Leu Phe Ser Ile Asp Lys Glu Tyr Phe Glu Lys Leu Gly Thr  
355 360 365

Tyr Asp Pro Gly Phe Asp Ile Trp Gly Gly Glu Asn Leu Glu Leu Ser  
370 375 380

Phe Lys Ile Trp Met Cys Gly Gly Thr Leu Glu Ile Val Pro Cys Ser  
385 390 395 400

His Val Gly His Val Phe Arg Lys Arg Ser Pro Tyr Lys Trp Arg Thr  
 405 410 415

Gly Val Asn Val Leu Lys Arg Asn Ser Ile Arg Leu Ala Glu Val Trp  
 420 425 430

Leu Asp Asp Tyr Lys Thr Tyr Tyr Tyr Glu Arg Ile Asn Asn Gln Leu  
 435 440 445

Gly Asp Phe Gly Asp Ile Ser Ser Arg Lys Lys Leu Arg Glu Asp Leu  
 450 455 460

Gly Cys Lys Ser Phe Lys Trp Tyr Leu Asp Asn Ile Tyr Pro Glu Leu  
 465 470 475 480

Phe Val Pro Gly Glu Ser Val Ala Lys Gly Glu Val Arg Asn Ser Ala  
 485 490 495

Val Gln Pro Ala Arg Cys Leu Asp Cys Met Val Gly Arg His Glu Lys  
 500 505 510

Asn Arg Pro Val Gly Thr Tyr Gln Cys His Gly Gln Gly Gly Asn Gln  
 515 520 525

Tyr Trp Met Leu Ser Lys Asp Gly Glu Ile Arg Arg Asp Glu Ser Cys  
 530 535 540

Val Asp Tyr Ala Gly Ser Asp Val Met Val Phe Pro Cys His Gly Met  
 545 550 555 560

Lys Gly Asn Gln Glu Trp Arg Tyr Asn His Asp Thr Gly Arg Leu Gln  
 565 570 575

His Ala Val Ser Gln Lys Cys Leu Gly Met Thr Lys Asp Gly Ala Lys  
 580 585 590

Leu Glu Met Val Ala Cys Gln Tyr Asp Asp Pro Tyr Gln His Trp Lys  
 595 600 605

Phe Lys Glu Tyr Asn Glu Ala Lys Ala Ile Glu His Gly Ala Lys Pro  
 610 615 620

Pro Ser  
 625

<210> 28

<211> 618

<212> PRT

<213> Caenorhabditis elegans

<400> 28

Met Ile Ala Ser Leu Ile Arg Ser Arg Arg Arg Ser Arg Arg Cys Val  
1 5 10 15

Val Tyr Ser Val Phe Leu Phe Gly Phe Leu Ala Leu Trp Gly Ser Phe  
20 25 30

Ala Leu Ala Leu Val Phe Leu Ser Asp Met Tyr Ile Gly Glu Asp Gln  
35 40 45

Ile Ser Thr Gln Lys Ala Ile Lys Pro Ile Ala Arg Ser Asn Tyr His  
50 55 60

Val Val Val Gly His Tyr Asn Gly Asn Leu Pro Glu Asp Lys Lys Arg  
65 70 75 80

Asn Leu Thr Ser Glu Glu Leu Asn Ala Asn Leu Tyr Ala Pro His Asp  
85 90 95

Asp Trp Gly Glu Gly Gly Ala Gly Val Ser His Leu Thr Pro Glu Gln  
100 105 110

Gln Lys Leu Ala Asp Ser Thr Phe Ala Val Asn Gln Phe Asn Leu Leu  
115 120 125

Val Ser Asp Gly Ile Ser Val Arg Arg Ser Leu Pro Glu Ile Arg Lys  
130 135 140

Pro Ser Cys Arg Asn Met Thr Tyr Pro Asp Asn Leu Pro Thr Thr Ser  
145 150 155 160

Val Ile Ile Val Tyr His Asn Glu Ala Tyr Ser Thr Leu Leu Arg Thr  
165 170 175

Val Trp Ser Val Ile Asp Arg Ser Pro Lys Glu Leu Leu Lys Glu Ile  
180 185 190

Ile Leu Val Asp Asp Phe Ser Asp Arg Glu Phe Leu Arg Tyr Pro Thr  
195 200 205

Leu Asp Thr Thr Leu Lys Pro Leu Pro Thr Asp Ile Lys Ile Ile Arg  
210 215 220

Ser Lys Glu Arg Val Gly Leu Ile Arg Ala Arg Met Met Gly Ala Gln  
225 230 235 240



Glu Ala Gln Gly Asp Val Leu Thr Phe Leu Asp Ser His Cys Glu Cys  
 245 250 255  
 Thr Lys Gly Trp Leu Glu Pro Leu Leu Thr Arg Ile Lys Leu Asn Arg  
 260 265 270  
 Lys Ala Val Pro Cys Pro Val Ile Asp Ile Ile Asn Asp Asn Thr Phe  
 275 280 285  
 Gln Tyr Gln Lys Gly Ile Glu Met Phe Arg Gly Gly Phe Asn Trp Asn  
 290 295 300  
 Leu Gln Phe Arg Trp Tyr Gly Met Pro Thr Ala Met Ala Lys Gln His  
 305 310 315 320  
 Leu Leu Asp Pro Thr Gly Pro Ile Glu Ser Pro Thr Met Ala Gly Gly  
 325 330 335  
 Leu Phe Ser Ile Asn Arg Asn Tyr Phe Glu Glu Leu Gly Glu Tyr Asp  
 340 345 350  
 Pro Gly Met Asp Ile Trp Gly Gly Glu Asn Leu Glu Met Ser Phe Arg  
 355 360 365  
 Ile Trp Gln Cys Gly Gly Arg Val Glu Ile Leu Pro Cys Ser His Val  
 370 375 380  
 Gly His Val Phe Arg Lys Ser Ser Pro His Asp Phe Pro Gly Lys Ser  
 385 390 395 400  
 Ser Gly Lys Val Leu Asn Thr Asn Leu Leu Arg Val Ala Glu Val Trp  
 405 410 415  
 Met Asp Asp Trp Lys His Tyr Phe Tyr Lys Ile Ala Pro Gln Ala His  
 420 425 430  
 Arg Met Arg Ser Ser Ile Asp Val Ser Glu Arg Val Glu Leu Arg Lys  
 435 440 445  
 Lys Leu Asn Cys Lys Ser Phe Lys Trp Tyr Leu Gln Asn Val Phe Gln  
 450 455 460  
 Asp His Phe Leu Pro Thr Pro Leu Asp Arg Phe Gly Arg Met Thr Ser  
 465 470 475 480  
 Ser Ser Asn Ser Ser Val Cys Leu Ala Trp Thr Leu Arg Ser Ser Gly  
 485 490 495

Ile Lys Thr Ala Ser Thr Ala Asp Cys Leu Lys Ile Phe His Lys Thr  
500 505 510

Gln Leu Trp Leu Tyr Thr Gly Asp Arg Arg Ile Arg Thr Asp Glu His  
515 520 525

Leu Cys Leu Ser Val Val Gln Leu Leu His Thr Thr Ser Asp Trp Lys  
530 535 540

Ile Gln Leu Lys Glu Cys Ala Gly Phe Asp Thr Glu Tyr Trp Asp Phe  
545 550 555 560

Lys Pro Lys Ile Gly Arg Phe Gln Asn Arg Lys Thr Gly Leu Cys Leu  
565 570 575

Ala Ser Pro Asp Ile Phe Asp Pro Thr Lys Asp Glu Phe Asn Pro Pro  
580 585 590

Ile Val Gln Lys Cys Arg Ser Ser Asn Asp Arg Gln Asn Trp Thr Ile  
595 600 605

Thr Glu Met Ser Trp Leu Pro Glu His Pro  
610 615

<210> 29  
<211> 579  
<212> PRT  
<213> Caenorhabditis elegans

<400> 29

Met Leu Arg Tyr Ile Ile Pro Arg Lys Lys Gly Thr Phe Val Ile Ala  
1 5 10 15

Ala Phe Leu Thr Val Ala Phe Phe Cys Ile Val Ala Tyr His Arg Asn  
20 25 30

Asp Arg Arg Arg Thr Lys Phe Gln Phe Pro Asp Ile Glu Lys Tyr Ala  
35 40 45

Glu Glu Leu Val Arg Leu Pro Glu Thr Trp Asn Gly Glu Leu His Gln  
50 55 60

Ile Pro Asn Tyr Thr Ala Pro Arg Glu Gly Pro Gly Glu Lys Gly Lys  
65 70 75 80

Pro Val Val Leu Thr Gly Lys Asp Ala Glu Leu Gly Gln Ala Asp Met

85

90

95

Lys Lys Trp Phe Met Asn Val His Ala Ser Asp Lys Ile Ser Leu Asp  
 100 105 110

Arg Asp Val Pro Asp Pro Arg Ile Gln Ala Cys Lys Asp Ile Lys Tyr  
 115 120 125

Asp Tyr Ala Ala Leu Pro Lys Thr Ser Val Ile Ile Ile Phe Thr Asp  
 130 135 140

Glu Ala Trp Thr Pro Leu Leu Arg Thr Val His Ser Val Ile Asn Arg  
 145 150 155 160

Ser Pro Pro Glu Leu Leu Gln Glu Val Ile Leu Leu Asp Asp Asn Ser  
 165 170 175

Lys Arg Gln Glu Leu Gln Glu Pro Leu Asp Glu His Ile Lys Arg Phe  
 180 185 190

Gly Gly Lys Val Arg Leu Ile Arg Lys His Asp Arg His Gly Leu Ile  
 195 200 205

Arg Ala Lys Leu Ala Gly Ala Arg Glu Ala Val Gly Asp Ile Ile Val  
 210 215 220

Phe Leu Asp Ser His Cys Glu Ala Asn His Gly Trp Leu Glu Pro Ile  
 225 230 235 240

Val Gln Arg Ile Ser Asp Glu Arg Thr Ala Ile Val Cys Pro Met Ile  
 245 250 255

Asp Ser Ile Ser Asp Asn Thr Leu Ala Tyr His Gly Asp Trp Ser Leu  
 260 265 270

Ser Thr Gly Gly Phe Ser Trp Ala Leu His Phe Thr Trp Glu Gly Leu  
 275 280 285

Ser Glu Glu Glu Gln Lys Arg Arg Thr Lys Pro Thr Asp Tyr Ile Arg  
 290 295 300

Ser Pro Thr Met Ala Gly Gly Leu Leu Ala Ala Asn Arg Glu Tyr Phe  
 305 310 315 320

Phe Glu Val Gly Gly Tyr Asp Glu Glu Met Asp Ile Trp Gly Gly Glu  
 325 330 335

Asn Leu Glu Ile Ser Phe Arg Ala Trp Met Cys Gly Gly Ser Ile Glu

